



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5 CHICAGO REGIONAL LABORATORY
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS 60605



Date: 1/27/2015
Subject: Review of Region 5 Data for BP Whiting Refinery
To: Air Division, US EPA Region 5
77 West Jackson Boulevard
Chicago, IL 60605
From: Wayne Whipple, Analyst
US EPA Region 5 Chicago Regional Laboratory

The data transmitted under this cover memo successfully passed CRL's data review procedures as documented in the current Quality Management Plan and applicable Standard Operating Procedures. In accordance with EPA's *Guidance on Environmental Data Verification and Data Validation* (Document EPA QA/G-8), CRL verified and validated the data but does not perform data quality assessment based on project plans.

This report was reviewed and the information provided herein accurately represents the analysis performed.

X 

January 27, 2015

Please contact the analyst with any technical report issues, Amanda Wroble at (312)-353-0375 for sample project concerns, and Sylvia Griffin at (312)-353-9073 with data transmittal questions. Thank you.

Attached are Results for: BP Whiting Refinery

Data Management Coordinator and Date Transmitted

Analyses included in this report:

Air Toxics Reimer 5



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Air Division, US EPA Region 5
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Chicago IL, 60605

Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Analysis Case Narrative for Volatile Organic Compounds (VOC) Air Toxics

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General Information

Three 15 L canisters and two six liter canisters were received in good condition from the Air and Radiation Division monitoring group on October 9, 2014. The samples met hold time.

Samples 1410012-04 and -05 were higher in pressure because of the regulators were not in proper calibration. This does not affect the data but the samples may have been collected under a shorter time integral than the other samples.

The samples were analyzed for VOC Air Toxics using SOP MS-005 Revision 6 with cold trap dehydration preconcentrator on Amelia. (Reference Method US EPA TO-15). Three pen and ink changes are included and used in the analysis, MS-005 PI01 through 03 that state the target analyte list and allow the use of the Pegasus MS for the TO-15 analysis, also the allowance of the manufacturer's suggested tune criteria and the update of the current sample monitoring compound concentrations with acceptance limits.

Data are reported to a reporting limit of 25 pptv and at least 35 pptv was requested in the Quality Assurance Project Plan, QAPP.

Standard Operating Procedures (SOP) and Method Deviations

The data quality objectives were met from the quality assurance project plan - "Passive Tube Canister Comparison Study_QAPP 082514".

The criteria used for determining if system contamination influences the sample results is for a sample result to be over five times the contamination in the method blank or the canister certification check blank. Any samples that have compounds not meeting this criteria are flagged either B or BC (blank interference possible or canister blank interference possible).

RPD and acceptance limits for LCS and sample duplicates are taken from the SOP and not the LIMS limits. The LIMS limits are for tracking purposes only.

Sample Analysis and Results



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Sample 1410012-01's first analysis is suspected of severe contamination that will prohibit any reporting from that sample. It was reanalyzed with a 5x dilution and the sample monitoring compounds are much closer to the expected background concentrations with only carbon tetrachloride being slightly above the expected concentration range. The data is reported from the diluted reanalysis for that sample and the reporting limits are raised by a factor of 5 to account for the dilution.

Propene is a combination of propane and propene that cannot be resolved. The compounds is flagged "K" as a high bias in all the samples. Acrolein and 1,3 butadiene are flagged high bias because of interferences from hydrocarbons in all the samples that cannot be resolved. It is very likely the results are a large overestimate. Propene also failed the initial demonstration of capability for the instrument Pegasus and will be reported as research because of incomplete demonstration of capability.

Propene, 1,1,2-trichloro-1,2,2-trifluoromethane, acrolein, acetone, cyclohexane, 2-butanone, and naphthalene have their reporting limit raised to 50 pptv because the calibration curve lowest reporting limit was not acceptable up to the 50 pptv calibration level. Also, 2-propanol's reporting limit was raised to 250pptv for the same reason. 4-Ethyltoluene appears to be coeluting with an unknown aromatic hydrocarbon that has a similar mass spectrum. The peak is asymmetric suggesting the coelution. The result is reported as 4-ethyl toluene but with a K flag suggesting a high bias from the coelution. The unknown suspected compound is most likely a similar aromatic hydrocarbon.

The laboratory batch duplicate was analyzed using 100 mL injection volume and has a dilution factor of two, with reporting limits adjusted appropriately.

Quality Control

Isopropyl alcohol failed calibration and is flagged J as estimated.

Naphthalene is flagged as estimated because the performance of the analytical system is not as reliable having an acceptable calibration response above 250 pptv for that late eluting compound and it fails the second source calibration check (ICV) along with poor reproducibility in the batch duplicate sample.

Dichlorotetrafluoroethane should have its reporting limit raised because of poor calibration performance below the 50 pptv level but the compound is a sample monitoring compound that is used for checking system performance and needs to be reported lower than the reporting limit; the reporting limit is lowered to 1 pptv to allow for monitoring information for sample monitoring compounds. A J flag is associated with the samples to qualify the results as estimated.

1,1,1-Trichloroethane is reported below the reporting limit for tracking of the sample monitoring compound. The result is within the expected global results, although is still flagged as estimated because it is below the detection limit. The result is also within 5 times the blank result but it is already flagged as estimated so no further action is required.

Carbon disulfide is rejected because the compound is performs very poorly.



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Canisters for samples -01 and -03 were sampled without a prior certification blank checks because of turnaround time did not permit the analysis. The prior samples for those canisters were in this study in sample set 1409007. The canisters were not subjected to high concentrations of compounds. The canisters were cleaned in accordance with the MS-005 SOP. No data was qualified for canister blanks on those two canisters.



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ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|-----------|---------------|--------|-----------------|-----------------|
| 4 | 1410012-01 | Air | Oct-09-14 08:32 | Oct-09-14 12:30 |
| 1 | 1410012-02 | Air | Oct-09-14 09:20 | Oct-09-14 12:30 |
| 3 | 1410012-03 | Air | Oct-09-14 10:00 | Oct-09-14 12:30 |
| 2 | 1410012-04 | Air | Oct-09-14 10:45 | Oct-09-14 12:30 |
| 2 | 1410012-05 | Air | Oct-09-14 10:45 | Oct-09-14 12:30 |



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Reported:
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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

4 (1410012-01RE1) Air Sampled: Oct-09-14 08:32 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|---------------------------|----------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Propene | 2.23 | K, Research | | 0.250 | ppbv | 5 | B410055 | Oct-09-14 | Oct-09-14 |
| Chloromethane | 0.631 | | | 0.125 | " | " | " | " | " |
| Vinyl chloride | U | | | 0.125 | " | " | " | " | " |
| 1,3-butadiene | U | | | 0.125 | " | " | " | " | " |
| Bromomethane | U | | | 0.125 | " | " | " | " | " |
| Chloroethane | U | | | 0.125 | " | " | " | " | " |
| Ethanol | 1.78 | | | 0.125 | " | " | " | " | " |
| Acrolein | 0.862 | K | | 0.250 | " | " | " | " | " |
| Isopropyl alcohol | 2.24 | J | | 1.25 | " | " | " | " | " |
| Acetone | 2.60 | J | | 0.250 | " | " | " | " | " |
| 1,1-Dichloroethene | U | | | 0.125 | " | " | " | " | " |
| Methyl iodide | U | | | 0.125 | " | " | " | " | " |
| Methylene chloride | U | | | 0.125 | " | " | " | " | " |
| Carbon disulfide | Rejected | | | 0.125 | " | " | " | " | " |
| Methyl tert-butyl ether | U | | | 0.125 | " | " | " | " | " |
| 1,1-Dichloroethane | U | | | 0.125 | " | " | " | " | " |
| Vinyl acetate | U | | | 0.125 | " | " | " | " | " |
| Hexane | 0.317 | B | | 0.125 | " | " | " | " | " |
| 2-Butanone | 0.358 | | | 0.250 | " | " | " | " | " |
| cis-1,2-Dichloroethene | U | | | 0.125 | " | " | " | " | " |
| trans-1,2-Dichloroethene | U | | | 0.125 | " | " | " | " | " |
| Chloroform | U | | | 0.125 | " | " | " | " | " |
| Ethyl acetate | U | | | 0.125 | " | " | " | " | " |
| 1,2-Dichloroethane | U | | | 0.125 | " | " | " | " | " |
| Cyclohexane | U | | | 0.250 | " | " | " | " | " |
| Tetrahydrofuran | U | | | 0.125 | " | " | " | " | " |
| Benzene | 0.228 | | | 0.125 | " | " | " | " | " |
| n-Heptane | 0.145 | | | 0.125 | " | " | " | " | " |
| 1,2-Dichloropropane | U | | | 0.125 | " | " | " | " | " |
| Trichloroethene | U | | | 0.125 | " | " | " | " | " |
| Bromodichloromethane | U | | | 0.125 | " | " | " | " | " |
| Methyl methacrylate | U | | | 0.125 | " | " | " | " | " |
| 1,4-Dioxane | U | | | 0.125 | " | " | " | " | " |
| cis-1,3-Dichloropropene | U | | | 0.125 | " | " | " | " | " |
| 4-Methyl-2-pentanone | U | | | 0.125 | " | " | " | " | " |
| trans-1,3-Dichloropropene | U | | | 0.125 | " | " | " | " | " |



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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

4 (1410012-01RE1) Air Sampled: Oct-09-14 08:32 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|---------------------------|----------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| 1,1,2-Trichloroethane | U | | | 0.125 | ppbv | 5 | B410055 | Oct-09-14 | Oct-09-14 |
| Dibromochloromethane | U | | | 0.125 | " | " | " | " | " |
| Toluene | 0.598 | | | 0.125 | " | " | " | " | " |
| 2-Hexanone | U | | | 0.125 | " | " | " | " | " |
| 1,2-Dibromoethane (EDB) | U | | | 0.125 | " | " | " | " | " |
| Tetrachloroethene | U | | | 0.125 | " | " | " | " | " |
| Chlorobenzene | U | | | 0.125 | " | " | " | " | " |
| Ethylbenzene | U | | | 0.125 | " | " | " | " | " |
| m+p-Xylene | 0.333 | | | 0.250 | " | " | " | " | " |
| Bromoform | U | | | 0.125 | " | " | " | " | " |
| Styrene | U | | | 0.125 | " | " | " | " | " |
| 1,1,2,2-Tetrachloroethane | U | | | 0.125 | " | " | " | " | " |
| o-Xylene | 0.128 | | | 0.125 | " | " | " | " | " |
| 4-ethyltoluene | U | K | | 0.125 | " | " | " | " | " |
| 1,3,5-Trimethylbenzene | U | | | 0.125 | " | " | " | " | " |
| 1,2,4-Trimethylbenzene | 0.161 | | | 0.125 | " | " | " | " | " |
| 1,3-Dichlorobenzene | U | | | 0.125 | " | " | " | " | " |
| Benzyl chloride | U | | | 0.125 | " | " | " | " | " |
| 1,4-Dichlorobenzene | U | | | 0.125 | " | " | " | " | " |
| 1,2-Dichlorobenzene | U | | | 0.125 | " | " | " | " | " |
| Hexachlorobutadiene | Rejected | | | 0.125 | " | " | " | " | " |
| 1,2,4-Trichlorobenzene | Rejected | | | 0.125 | " | " | " | " | " |
| Naphthalene | 1.04 | J | | 0.250 | " | " | " | " | " |

| Surogate | Result | | %REC | %REC Limits | Batch | Prepared | Analyzed |
|--|--------|---|------|----------------|-------|----------|----------|
| Surrogate: Dichlorodifluoromethane | 0.487 | | 93% | 90-120 | " | " | " |
| Surrogate: Dichlorotetrafluoroethane | 0.0280 | J | 140% | 80-120 | " | " | " |
| Surrogate: Trichlorofluoromethane | 0.236 | | 99% | 90-120 | " | " | " |
| Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F) | U | | 118% | 90-120 | " | " | " |
| Surrogate: 1,1,1-Trichloroethane | U | J | % | 80-120 | " | " | " |
| Surrogate: Carbon tetrachloride | U | | 102% | 80-120 | " | " | " |



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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

1 (1410012-02) Air Sampled: Oct-09-14 09:20 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|---------------------------|----------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Propene | 0.854 | K, Research | | 0.0500 | ppbv | 1 | B410055 | Oct-09-14 | Oct-09-14 |
| Chloromethane | 0.546 | | | 0.0250 | " | " | " | " | " |
| Vinyl chloride | U | | | 0.0250 | " | " | " | " | " |
| 1,3-butadiene | 0.0339 | K | | 0.0250 | " | " | " | " | " |
| Bromomethane | U | | | 0.0250 | " | " | " | " | " |
| Chloroethane | U | | | 0.0250 | " | " | " | " | " |
| Ethanol | 1.52 | | | 0.0250 | " | " | " | " | " |
| Acrolein | 0.416 | K | | 0.0500 | " | " | " | " | " |
| Isopropyl alcohol | U | BC, J | | 0.250 | " | " | " | " | " |
| Acetone | 1.74 | J | | 0.0500 | " | " | " | " | " |
| 1,1-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Methylene chloride | 0.116 | BC | | 0.0250 | " | " | " | " | " |
| Carbon disulfide | Rejected | | | 0.0250 | " | " | " | " | " |
| Cyclopentane | U | | | 0.0250 | " | " | " | " | " |
| Methyl tert-butyl ether | U | | | 0.0250 | " | " | " | " | " |
| 1,1-Dichloroethane | U | | | 0.0250 | " | " | " | " | " |
| Vinyl acetate | U | | | 0.0250 | " | " | " | " | " |
| Hexane | 0.261 | B | | 0.0250 | " | " | " | " | " |
| 2-Butanone | 0.226 | | | 0.0500 | " | " | " | " | " |
| cis-1,2-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| trans-1,2-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Chloroform | U | | | 0.0250 | " | " | " | " | " |
| Ethyl acetate | 0.0480 | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichloroethane | U | | | 0.0250 | " | " | " | " | " |
| Cyclohexane | 0.189 | | | 0.0500 | " | " | " | " | " |
| Tetrahydrofuran | U | | | 0.0250 | " | " | " | " | " |
| Benzene | 0.152 | | | 0.0250 | " | " | " | " | " |
| n-Heptane | 0.132 | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichloropropane | U | | | 0.0250 | " | " | " | " | " |
| Trichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Bromodichloromethane | U | | | 0.0250 | " | " | " | " | " |
| Methyl methacrylate | U | | | 0.0250 | " | " | " | " | " |
| 1,4-Dioxane | U | | | 0.0250 | " | " | " | " | " |
| cis-1,3-Dichloropropene | U | | | 0.0250 | " | " | " | " | " |
| 4-Methyl-2-pentanone | 0.0526 | B | | 0.0250 | " | " | " | " | " |
| trans-1,3-Dichloropropene | U | | | 0.0250 | " | " | " | " | " |



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1 (1410012-02) Air Sampled: Oct-09-14 09:20 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|---------------------------|----------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| 1,1,2-Trichloroethane | U | | | 0.0250 | ppbv | 1 | B410055 | Oct-09-14 | Oct-09-14 |
| Dibromochloromethane | U | | | 0.0250 | " | " | " | " | " |
| Toluene | 0.319 | | | 0.0250 | " | " | " | " | " |
| 2-Hexanone | U | | | 0.0250 | " | " | " | " | " |
| 1,2-Dibromoethane (EDB) | U | | | 0.0250 | " | " | " | " | " |
| Tetrachloroethene | U | | | 0.0250 | " | " | " | " | " |
| Chlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Ethylbenzene | 0.0593 | | | 0.0250 | " | " | " | " | " |
| m+p-Xylene | 0.187 | | | 0.0500 | " | " | " | " | " |
| Bromoform | U | | | 0.0250 | " | " | " | " | " |
| Styrene | U | | | 0.0250 | " | " | " | " | " |
| 1,1,2,2-Tetrachloroethane | U | | | 0.0250 | " | " | " | " | " |
| o-Xylene | 0.0650 | | | 0.0250 | " | " | " | " | " |
| 4-ethyltoluene | 0.0815 | K | | 0.0250 | " | " | " | " | " |
| 1,3,5-Trimethylbenzene | 0.0257 | | | 0.0250 | " | " | " | " | " |
| 1,2,4-Trimethylbenzene | 0.0830 | | | 0.0250 | " | " | " | " | " |
| 1,3-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Benzyl chloride | U | | | 0.0250 | " | " | " | " | " |
| 1,4-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Hexachlorobutadiene | Rejected | | | 0.0250 | " | " | " | " | " |
| 1,2,4-Trichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Naphthalene | 0.359 | J | | 0.0500 | " | " | " | " | " |

| Surogate | Result | | %REC | %REC Limits | Batch | Prepared | Analyzed |
|--|---------|---|------|----------------|-------|----------|----------|
| Surrogate: Dichlorodifluoromethane | 0.483 | | 92% | 90-120 | " | " | " |
| Surrogate: Dichlorotetrafluoroethane | 0.0220 | J | 110% | 80-120 | " | " | " |
| Surrogate: Trichlorofluoromethane | 0.226 | | 95% | 90-120 | " | " | " |
| Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F) | 0.0819 | | 112% | 90-120 | " | " | " |
| Surrogate: 1,1,1-Trichloroethane | 3.95E-3 | J | 79% | 80-120 | " | " | " |
| Surrogate: Carbon tetrachloride | 0.0880 | | 102% | 80-120 | " | " | " |



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3 (1410012-03) Air Sampled: Oct-09-14 10:00 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|---------------------------|----------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Propene | 0.773 | K, Research | | 0.0500 | ppbv | 1 | B410055 | Oct-09-14 | Oct-09-14 |
| Chloromethane | 0.495 | | | 0.0250 | " | " | " | " | " |
| Vinyl chloride | U | | | 0.0250 | " | " | " | " | " |
| 1,3-butadiene | U | K | | 0.0250 | " | " | " | " | " |
| Bromomethane | U | | | 0.0250 | " | " | " | " | " |
| Chloroethane | U | | | 0.0250 | " | " | " | " | " |
| Ethanol | 1.77 | | | 0.0250 | " | " | " | " | " |
| Acrolein | 0.245 | K | | 0.0500 | " | " | " | " | " |
| Isopropyl alcohol | U | J | | 0.250 | " | " | " | " | " |
| Acetone | 1.71 | J | | 0.0500 | " | " | " | " | " |
| 1,1-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Methylene chloride | 0.100 | | | 0.0250 | " | " | " | " | " |
| Carbon disulfide | Rejected | | | 0.0250 | " | " | " | " | " |
| Cyclopentane | U | | | 0.0250 | " | " | " | " | " |
| Methyl tert-butyl ether | U | | | 0.0250 | " | " | " | " | " |
| 1,1-Dichloroethane | U | | | 0.0250 | " | " | " | " | " |
| Vinyl acetate | U | | | 0.0250 | " | " | " | " | " |
| Hexane | 0.137 | B | | 0.0250 | " | " | " | " | " |
| 2-Butanone | 0.209 | | | 0.0500 | " | " | " | " | " |
| cis-1,2-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| trans-1,2-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Chloroform | 0.0273 | | | 0.0250 | " | " | " | " | " |
| Ethyl acetate | 0.0634 | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichloroethane | U | | | 0.0250 | " | " | " | " | " |
| Cyclohexane | 0.0933 | | | 0.0500 | " | " | " | " | " |
| Tetrahydrofuran | U | | | 0.0250 | " | " | " | " | " |
| Benzene | 0.129 | | | 0.0250 | " | " | " | " | " |
| n-Heptane | 0.0835 | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichloropropane | U | | | 0.0250 | " | " | " | " | " |
| Trichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Bromodichloromethane | U | | | 0.0250 | " | " | " | " | " |
| Methyl methacrylate | U | | | 0.0250 | " | " | " | " | " |
| 1,4-Dioxane | U | | | 0.0250 | " | " | " | " | " |
| cis-1,3-Dichloropropene | U | | | 0.0250 | " | " | " | " | " |
| 4-Methyl-2-pentanone | 0.0417 | B | | 0.0250 | " | " | " | " | " |
| trans-1,3-Dichloropropene | U | | | 0.0250 | " | " | " | " | " |



Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Air Division, US EPA Region 5
77 West Jackson Boulevard
Chicago IL, 60605

Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

3 (1410012-03) Air Sampled: Oct-09-14 10:00 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|---------------------------|----------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| 1,1,2-Trichloroethane | U | | | 0.0250 | ppbv | 1 | B410055 | Oct-09-14 | Oct-09-14 |
| Dibromochloromethane | U | | | 0.0250 | " | " | " | " | " |
| Toluene | 0.326 | | | 0.0250 | " | " | " | " | " |
| 2-Hexanone | U | | | 0.0250 | " | " | " | " | " |
| 1,2-Dibromoethane (EDB) | U | | | 0.0250 | " | " | " | " | " |
| Tetrachloroethene | U | | | 0.0250 | " | " | " | " | " |
| Chlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Ethylbenzene | 0.0697 | | | 0.0250 | " | " | " | " | " |
| m+p-Xylene | 0.236 | | | 0.0500 | " | " | " | " | " |
| Bromoform | U | | | 0.0250 | " | " | " | " | " |
| Styrene | U | | | 0.0250 | " | " | " | " | " |
| 1,1,2,2-Tetrachloroethane | U | | | 0.0250 | " | " | " | " | " |
| o-Xylene | 0.0901 | | | 0.0250 | " | " | " | " | " |
| 4-ethyltoluene | 0.0921 | K | | 0.0250 | " | " | " | " | " |
| 1,3,5-Trimethylbenzene | 0.0290 | | | 0.0250 | " | " | " | " | " |
| 1,2,4-Trimethylbenzene | 0.0874 | | | 0.0250 | " | " | " | " | " |
| 1,3-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Benzyl chloride | U | | | 0.0250 | " | " | " | " | " |
| 1,4-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Hexachlorobutadiene | Rejected | | | 0.0250 | " | " | " | " | " |
| 1,2,4-Trichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Naphthalene | 0.385 | J | | 0.0500 | " | " | " | " | " |

| Surogate | Result | | %REC | %REC Limits | Batch | Prepared | Analyzed |
|--|---------|---|------|----------------|-------|----------|----------|
| Surrogate: Dichlorodifluoromethane | 0.486 | | 93% | 90-120 | " | " | " |
| Surrogate: Dichlorotetrafluoroethane | 0.0228 | J | 114% | 80-120 | " | " | " |
| Surrogate: Trichlorofluoromethane | 0.231 | | 97% | 90-120 | " | " | " |
| Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F) | 0.0837 | | 115% | 90-120 | " | " | " |
| Surrogate: 1,1,1-Trichloroethane | 3.77E-3 | J | 75% | 80-120 | " | " | " |
| Surrogate: Carbon tetrachloride | 0.0852 | | 99% | 80-120 | " | " | " |



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1410012-04) Air Sampled: Oct-09-14 10:45 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|---------------------------|----------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Propene | 0.866 | K, Research | | 0.0500 | ppbv | 1 | B410055 | Oct-09-14 | Oct-09-14 |
| Chloromethane | 0.533 | | | 0.0250 | " | " | " | " | " |
| Vinyl chloride | U | | | 0.0250 | " | " | " | " | " |
| 1,3-butadiene | 0.0324 | K | | 0.0250 | " | " | " | " | " |
| Bromomethane | U | | | 0.0250 | " | " | " | " | " |
| Chloroethane | U | | | 0.0250 | " | " | " | " | " |
| Ethanol | 1.91 | | | 0.0250 | " | " | " | " | " |
| Acrolein | 0.337 | K | | 0.0500 | " | " | " | " | " |
| Isopropyl alcohol | 1.94 | J | | 0.250 | " | " | " | " | " |
| 1,1-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Methylene chloride | 0.111 | | | 0.0250 | " | " | " | " | " |
| Carbon disulfide | Rejected | | | 0.0250 | " | " | " | " | " |
| Cyclopentane | U | | | 0.0250 | " | " | " | " | " |
| Methyl tert-butyl ether | U | | | 0.0250 | " | " | " | " | " |
| 1,1-Dichloroethane | U | | | 0.0250 | " | " | " | " | " |
| Vinyl acetate | U | | | 0.0250 | " | " | " | " | " |
| Hexane | 0.177 | B | | 0.0250 | " | " | " | " | " |
| 2-Butanone | 0.253 | | | 0.0500 | " | " | " | " | " |
| cis-1,2-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| trans-1,2-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Chloroform | U | | | 0.0250 | " | " | " | " | " |
| Ethyl acetate | 0.0676 | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichloroethane | U | | | 0.0250 | " | " | " | " | " |
| Cyclohexane | U | | | 0.0500 | " | " | " | " | " |
| Tetrahydrofuran | U | | | 0.0250 | " | " | " | " | " |
| Benzene | 0.154 | | | 0.0250 | " | " | " | " | " |
| n-Heptane | 0.108 | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichloropropane | U | | | 0.0250 | " | " | " | " | " |
| Trichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Bromodichloromethane | U | | | 0.0250 | " | " | " | " | " |
| Methyl methacrylate | U | | | 0.0250 | " | " | " | " | " |
| 1,4-Dioxane | U | | | 0.0250 | " | " | " | " | " |
| cis-1,3-Dichloropropene | U | | | 0.0250 | " | " | " | " | " |
| 4-Methyl-2-pentanone | 0.0497 | B | | 0.0250 | " | " | " | " | " |
| trans-1,3-Dichloropropene | U | | | 0.0250 | " | " | " | " | " |
| 1,1,2-Trichloroethane | U | | | 0.0250 | " | " | " | " | " |



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified) US EPA Region 5 Chicago Regional Laboratory

2 (1410012-04) Air Sampled: Oct-09-14 10:45 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|---------------------------|----------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Dibromochloromethane | U | | | 0.0250 | ppbv | 1 | B410055 | Oct-09-14 | Oct-09-14 |
| Toluene | 0.407 | | | 0.0250 | " | " | " | " | " |
| 2-Hexanone | U | | | 0.0250 | " | " | " | " | " |
| 1,2-Dibromoethane (EDB) | U | | | 0.0250 | " | " | " | " | " |
| Tetrachloroethene | U | | | 0.0250 | " | " | " | " | " |
| Chlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Ethylbenzene | 0.0748 | | | 0.0250 | " | " | " | " | " |
| m+p-Xylene | 0.240 | | | 0.0500 | " | " | " | " | " |
| Bromoform | U | | | 0.0250 | " | " | " | " | " |
| Styrene | U | | | 0.0250 | " | " | " | " | " |
| 1,1,2,2-Tetrachloroethane | U | | | 0.0250 | " | " | " | " | " |
| o-Xylene | 0.0853 | | | 0.0250 | " | " | " | " | " |
| 4-ethyltoluene | 0.0916 | K | | 0.0250 | " | " | " | " | " |
| 1,3,5-Trimethylbenzene | 0.0271 | | | 0.0250 | " | " | " | " | " |
| 1,2,4-Trimethylbenzene | 0.0870 | | | 0.0250 | " | " | " | " | " |
| 1,3-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Benzyl chloride | U | | | 0.0250 | " | " | " | " | " |
| 1,4-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Hexachlorobutadiene | Rejected | | | 0.0250 | " | " | " | " | " |
| 1,2,4-Trichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Naphthalene | 0.514 | J | | 0.0500 | " | " | " | " | " |

| Surogate | Result | | %REC | %REC Limits | Batch | Prepared | Analyzed |
|--|---------|---|------|----------------|-------|----------|----------|
| Surrogate: Dichlorodifluoromethane | 0.509 | | 97% | 90-120 | " | " | " |
| Surrogate: Dichlorotetrafluoroethane | 0.0229 | J | 114% | 80-120 | " | " | " |
| Surrogate: Trichlorofluoromethane | 0.238 | | 100% | 90-120 | " | " | " |
| Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F) | 0.0876 | | 120% | 90-120 | " | " | " |
| Surrogate: 1,1,1-Trichloroethane | 3.66E-3 | J | 73% | 80-120 | " | " | " |
| Surrogate: Carbon tetrachloride | 0.0880 | | 102% | 80-120 | " | " | " |



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1410012-04RE1) Air Sampled: Oct-09-14 10:45 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|---------|--------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Acetone | 2.43 | J | | 0.250 | ppbv | 5 | B410055 | Oct-09-14 | Oct-09-14 |

2 (1410012-05) Air Sampled: Oct-09-14 10:45 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|--------------------------|----------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Propene | 0.877 | K, Research | | 0.0500 | ppbv | 1 | B410055 | Oct-09-14 | Oct-09-14 |
| Chloromethane | 0.536 | | | 0.0250 | " | " | " | " | " |
| Vinyl chloride | U | | | 0.0250 | " | " | " | " | " |
| 1,3-butadiene | U | K | | 0.0250 | " | " | " | " | " |
| Bromomethane | U | | | 0.0250 | " | " | " | " | " |
| Chloroethane | U | | | 0.0250 | " | " | " | " | " |
| Ethanol | 1.97 | | | 0.0250 | " | " | " | " | " |
| Acrolein | 0.420 | K | | 0.0500 | " | " | " | " | " |
| 1,1-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Methylene chloride | 0.111 | | | 0.0250 | " | " | " | " | " |
| Carbon disulfide | Rejected | | | 0.0250 | " | " | " | " | " |
| Cyclopentane | U | | | 0.0250 | " | " | " | " | " |
| Methyl tert-butyl ether | U | | | 0.0250 | " | " | " | " | " |
| 1,1-Dichloroethane | U | | | 0.0250 | " | " | " | " | " |
| Vinyl acetate | U | | | 0.0250 | " | " | " | " | " |
| Hexane | 0.178 | B | | 0.0250 | " | " | " | " | " |
| 2-Butanone | 0.257 | BC | | 0.0500 | " | " | " | " | " |
| cis-1,2-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| trans-1,2-Dichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Chloroform | 0.0294 | | | 0.0250 | " | " | " | " | " |
| Ethyl acetate | 0.0731 | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichloroethane | U | | | 0.0250 | " | " | " | " | " |
| Cyclohexane | U | | | 0.0500 | " | " | " | " | " |
| Tetrahydrofuran | U | | | 0.0250 | " | " | " | " | " |
| Benzene | 0.156 | | | 0.0250 | " | " | " | " | " |
| n-Heptane | 0.114 | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichloropropane | U | | | 0.0250 | " | " | " | " | " |
| Trichloroethene | U | | | 0.0250 | " | " | " | " | " |
| Bromodichloromethane | U | | | 0.0250 | " | " | " | " | " |
| Methyl methacrylate | U | | | 0.0250 | " | " | " | " | " |
| 1,4-Dioxane | U | | | 0.0250 | " | " | " | " | " |



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1410012-05) Air Sampled: Oct-09-14 10:45 Received: Oct-09-14 12:30

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|---------------------------|----------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| cis-1,3-Dichloropropene | U | | | 0.0250 | ppbv | 1 | B410055 | Oct-09-14 | Oct-09-14 |
| 4-Methyl-2-pentanone | 0.0488 | B | | 0.0250 | " | " | " | " | " |
| trans-1,3-Dichloropropene | U | | | 0.0250 | " | " | " | " | " |
| 1,1,2-Trichloroethane | U | | | 0.0250 | " | " | " | " | " |
| Dibromochloromethane | U | | | 0.0250 | " | " | " | " | " |
| Toluene | 0.405 | | | 0.0250 | " | " | " | " | " |
| 2-Hexanone | U | | | 0.0250 | " | " | " | " | " |
| 1,2-Dibromoethane (EDB) | U | | | 0.0250 | " | " | " | " | " |
| Tetrachloroethene | U | | | 0.0250 | " | " | " | " | " |
| Chlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Ethylbenzene | 0.0765 | | | 0.0250 | " | " | " | " | " |
| m+p-Xylene | 0.242 | | | 0.0500 | " | " | " | " | " |
| Bromoform | U | | | 0.0250 | " | " | " | " | " |
| Styrene | U | | | 0.0250 | " | " | " | " | " |
| 1,1,2,2-Tetrachloroethane | U | | | 0.0250 | " | " | " | " | " |
| o-Xylene | 0.0890 | | | 0.0250 | " | " | " | " | " |
| 4-ethyltoluene | 0.0903 | K | | 0.0250 | " | " | " | " | " |
| 1,3,5-Trimethylbenzene | 0.0271 | | | 0.0250 | " | " | " | " | " |
| 1,2,4-Trimethylbenzene | 0.0866 | | | 0.0250 | " | " | " | " | " |
| 1,3-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Benzyl chloride | U | | | 0.0250 | " | " | " | " | " |
| 1,4-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| 1,2-Dichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Hexachlorobutadiene | Rejected | | | 0.0250 | " | " | " | " | " |
| 1,2,4-Trichlorobenzene | U | | | 0.0250 | " | " | " | " | " |
| Naphthalene | 0.443 | J | | 0.0500 | " | " | " | " | " |

| Surrogate | Result | | %REC | %REC Limits | Batch | Prepared | Analyzed |
|--|---------|---|------|----------------|-------|----------|----------|
| Surrogate: Dichlorodifluoromethane | 0.513 | | 98% | 90-120 | " | " | " |
| Surrogate: Dichlorotetrafluoroethane | 0.0232 | J | 116% | 80-120 | " | " | " |
| Surrogate: Trichlorofluoromethane | 0.239 | | 100% | 90-120 | " | " | " |
| Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F) | 0.0874 | | 120% | 90-120 | " | " | " |
| Surrogate: 1,1,1-Trichloroethane | 3.78E-3 | J | 76% | 80-120 | " | " | " |
| Surrogate: Carbon tetrachloride | 0.0927 | | 108% | 80-120 | " | " | " |



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1410012-05RE1) Air **Sampled: Oct-09-14 10:45** **Received: Oct-09-14 12:30**

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed |
|--------------------------|-------------|-----------------------|-----|--------------------|-------|----------|---------|-----------|-----------|
| Isopropyl alcohol | 1.44 | J | | 1.25 | ppbv | 5 | B410055 | Oct-09-14 | Oct-09-14 |
| Acetone | 2.34 | J, BC | | 0.250 | " | " | " | " | " |



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410055 - ColdTrap Dehydration

Blank (B410055-BLK1)

Prepared & Analyzed: Oct-09-14

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|--------------------------|----------|-----------------------|-----|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|
| Chloromethane | U | | | 0.0250 | ppbv | | | | | | |
| Vinyl chloride | U | | | 0.0250 | " | | | | | | |
| 1,3-butadiene | U | | | 0.0250 | " | | | | | | |
| Bromomethane | U | | | 0.0250 | " | | | | | | |
| Chloroethane | U | | | 0.0250 | " | | | | | | |
| Ethanol | 0.0853 | | | 0.0250 | " | | | | | | |
| Acrolein | U | K | | 0.0500 | " | | | | | | |
| Isopropyl alcohol | U | J | | 0.250 | " | | | | | | |
| Acetone | 0.0968 | | | 0.0500 | " | | | | | | |
| 1,1-Dichloroethene | U | | | 0.0250 | " | | | | | | |
| Methylene chloride | U | | | 0.0250 | " | | | | | | |
| Carbon disulfide | Rejected | | | 0.0250 | " | | | | | | |
| Cyclopentane | U | | | 0.0250 | " | | | | | | |
| Methyl tert-butyl ether | U | | | 0.0250 | " | | | | | | |
| 1,1-Dichloroethane | U | | | 0.0250 | " | | | | | | |
| Vinyl acetate | U | | | 0.0250 | " | | | | | | |
| Hexane | 0.0989 | | | 0.0250 | " | | | | | | |
| 2-Butanone | U | | | 0.0500 | " | | | | | | |
| cis-1,2-Dichloroethene | U | | | 0.0250 | " | | | | | | |
| trans-1,2-Dichloroethene | U | | | 0.0250 | " | | | | | | |
| Chloroform | U | | | 0.0250 | " | | | | | | |
| Ethyl acetate | U | | | 0.0250 | " | | | | | | |
| 1,2-Dichloroethane | U | | | 0.0250 | " | | | | | | |
| Cyclohexane | U | | | 0.0500 | " | | | | | | |
| Tetrahydrofuran | U | | | 0.0250 | " | | | | | | |
| Benzene | U | | | 0.0250 | " | | | | | | |
| n-Heptane | U | | | 0.0250 | " | | | | | | |
| 1,2-Dichloropropane | U | | | 0.0250 | " | | | | | | |
| Trichloroethene | U | | | 0.0250 | " | | | | | | |
| Bromodichloromethane | U | | | 0.0250 | " | | | | | | |
| Methyl methacrylate | U | | | 0.0250 | " | | | | | | |
| 1,4-Dioxane | U | | | 0.0250 | " | | | | | | |
| cis-1,3-Dichloropropene | U | | | 0.0250 | " | | | | | | |



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410055 - ColdTrap Dehydration

Blank (B410055-BLK1)

Prepared & Analyzed: Oct-09-14

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|--|----------|-----------------------|-----|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|
| 4-Methyl-2-pentanone | U | | | 0.0250 | ppbv | | | | | | |
| trans-1,3-Dichloropropene | U | | | 0.0250 | " | | | | | | |
| 1,1,2-Trichloroethane | U | | | 0.0250 | " | | | | | | |
| Dibromochloromethane | U | | | 0.0250 | " | | | | | | |
| Toluene | U | | | 0.0250 | " | | | | | | |
| 2-Hexanone | U | | | 0.0250 | " | | | | | | |
| 1,2-Dibromoethane (EDB) | U | | | 0.0250 | " | | | | | | |
| Tetrachloroethene | U | | | 0.0250 | " | | | | | | |
| Chlorobenzene | U | | | 0.0250 | " | | | | | | |
| Ethylbenzene | U | | | 0.0250 | " | | | | | | |
| m+p-Xylene | U | | | 0.0500 | " | | | | | | |
| Bromoform | U | | | 0.0250 | " | | | | | | |
| Styrene | U | | | 0.0250 | " | | | | | | |
| 1,1,2,2-Tetrachloroethane | U | | | 0.0250 | " | | | | | | |
| o-Xylene | U | | | 0.0250 | " | | | | | | |
| 4-ethyltoluene | U | K | | 0.0250 | " | | | | | | |
| 1,3,5-Trimethylbenzene | U | | | 0.0250 | " | | | | | | |
| 1,2,4-Trimethylbenzene | U | | | 0.0250 | " | | | | | | |
| 1,3-Dichlorobenzene | U | | | 0.0250 | " | | | | | | |
| Benzyl chloride | U | | | 0.0250 | " | | | | | | |
| 1,4-Dichlorobenzene | U | | | 0.0250 | " | | | | | | |
| 1,2-Dichlorobenzene | U | | | 0.0250 | " | | | | | | |
| Hexachlorobutadiene | Rejected | | | 0.0250 | " | | | | | | |
| 1,2,4-Trichlorobenzene | U | | | 0.0250 | " | | | | | | |
| Naphthalene | 0.0593 | J | | 0.0500 | " | | | | | | |
| Surrogate: Dichlorodifluoromethane | U | | | | " | 0.5250 | | 1% | 90-120 | | |
| Surrogate: Dichlorotetrafluoroethane | U | | | | " | 2.000E-2 | | % | 80-120 | | |
| Surrogate: Trichlorofluoromethane | U | | | | " | 0.2390 | | % | 90-120 | | |
| Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (Freon) | U | | | | " | 7.300E-2 | | % | 90-120 | | |
| Surrogate: 1,1,1-Trichloroethane | U | | | | " | 5.000E-3 | | % | 80-120 | | |
| Surrogate: Carbon tetrachloride | U | | | | " | 8.600E-2 | | % | 80-120 | | |



Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Air Division, US EPA Region 5
77 West Jackson Boulevard
Chicago IL, 60605

Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410055 - ColdTrap Dehydration

LCS (B410055-BS1)

Prepared & Analyzed: Oct-09-14

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Spike Level | Source Result | %REC Limits | RPD | RPD Limit |
|--------------------------|----------|-----------------------|-----|--------------------|-------|----------------|------------------|----------------|-----|--------------|
| Propene | 0.503 | Research | | 0.0500 | ppbv | 0.5000 | | 101% 76-112 | | |
| Chloromethane | 0.481 | | | 0.0250 | " | 0.5000 | | 96% 77.6-116 | | |
| Vinyl chloride | 0.502 | | | 0.0250 | " | 0.5000 | | 100% 77.4-117 | | |
| 1,3-butadiene | 0.481 | | | 0.0250 | " | 0.5000 | | 96% 77.7-115 | | |
| Bromomethane | 0.512 | | | 0.0250 | " | 0.5000 | | 102% 75.2-117 | | |
| Chloroethane | 0.498 | | | 0.0250 | " | 0.5000 | | 100% 79.8-114 | | |
| Ethanol | 0.644 | | | 0.0250 | " | 0.5000 | | 129% 50-124 | | |
| Acrolein | 0.601 | | | 0.0500 | " | 0.5000 | | 120% 67.9-130 | | |
| Isopropyl alcohol | 0.395 | J | | 0.250 | " | 0.5000 | | 79% 81-106 | | |
| Acetone | 0.647 | | | 0.0500 | " | 0.5000 | | 129% 60-137 | | |
| 1,1-Dichloroethene | 0.520 | | | 0.0250 | " | 0.5000 | | 104% 77.3-118 | | |
| Methylene chloride | 0.515 | | | 0.0250 | " | 0.5000 | | 103% 78.7-117 | | |
| Carbon disulfide | Rejected | | | 0.0250 | " | 0.5000 | | 195% 53-140 | | |
| Cyclopentane | U | | | 0.0250 | " | | | 74-117 | | |
| Methyl tert-butyl ether | 0.501 | | | 0.0250 | " | 0.5000 | | 100% 79.1-118 | | |
| 1,1-Dichloroethane | 0.504 | | | 0.0250 | " | 0.5000 | | 101% 79.8-117 | | |
| Vinyl acetate | 0.516 | | | 0.0250 | " | 0.5000 | | 103% 85-106 | | |
| Hexane | 0.504 | | | 0.0250 | " | 0.5000 | | 101% 70.1-121 | | |
| 2-Butanone | 0.515 | | | 0.0500 | " | 0.5000 | | 103% 82-108 | | |
| cis-1,2-Dichloroethene | 0.518 | | | 0.0250 | " | 0.5000 | | 104% 78.1-115 | | |
| trans-1,2-Dichloroethene | 0.516 | | | 0.0250 | " | 0.5000 | | 103% 0-200 | | |
| Chloroform | 0.519 | | | 0.0250 | " | 0.5000 | | 104% 79.6-115 | | |
| Ethyl acetate | 0.511 | | | 0.0250 | " | 0.5000 | | 102% 0-200 | | |
| 1,2-Dichloroethane | 0.509 | | | 0.0250 | " | 0.5000 | | 102% 79.8-115 | | |
| Cyclohexane | 0.487 | | | 0.0500 | " | 0.5000 | | 97% 72.5-119 | | |
| Tetrahydrofuran | 0.522 | | | 0.0250 | " | 0.5000 | | 104% 0-200 | | |
| Benzene | 0.526 | | | 0.0250 | " | 0.5000 | | 105% 75.7-118 | | |
| n-Heptane | 0.495 | | | 0.0250 | " | 0.5000 | | 99% 66.9-152 | | |
| 1,2-Dichloropropane | 0.514 | | | 0.0250 | " | 0.5000 | | 103% 76.8-118 | | |
| Trichloroethene | 0.498 | | | 0.0250 | " | 0.5000 | | 100% 70.1-119 | | |
| Bromodichloromethane | 0.538 | | | 0.0250 | " | 0.5000 | | 108% 75.8-117 | | |
| Methyl methacrylate | 0.520 | | | 0.0250 | " | 0.5000 | | 104% 0-200 | | |
| 1,4-Dioxane | 0.507 | | | 0.0250 | " | 0.5000 | | 101% 54.7-150 | | |
| cis-1,3-Dichloropropene | 0.554 | | | 0.0250 | " | 0.5000 | | 111% 75.5-115 | | |



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Air Division, US EPA Region 5
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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410055 - ColdTrap Dehydration

LCS (B410055-BS1)

Prepared & Analyzed: Oct-09-14

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|----------|-----------------------|-----|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|
| 4-Methyl-2-pentanone | 0.485 | | | 0.0250 | ppbv | 0.5000 | | 97% | 62.9-133 | | |
| trans-1,3-Dichloropropene | 0.531 | | | 0.0250 | " | 0.5000 | | 106% | 75.8-117 | | |
| 1,1,2-Trichloroethane | 0.504 | | | 0.0250 | " | 0.5000 | | 101% | 92.3-106 | | |
| Dibromochloromethane | 0.553 | | | 0.0250 | " | 0.5000 | | 111% | 69-132 | | |
| Toluene | 0.540 | | | 0.0250 | " | 0.5000 | | 108% | 73.2-120 | | |
| 2-Hexanone | 0.514 | | | 0.0250 | " | 0.5000 | | 103% | 76-110 | | |
| 1,2-Dibromoethane (EDB) | 0.539 | | | 0.0250 | " | 0.5000 | | 108% | 75.5-118 | | |
| Tetrachloroethene | 0.510 | | | 0.0250 | " | 0.5000 | | 102% | 67.1-125 | | |
| Chlorobenzene | 0.511 | | | 0.0250 | " | 0.5000 | | 102% | 68.5-121 | | |
| Ethylbenzene | 0.490 | | | 0.0250 | " | 0.5000 | | 98% | 74.9-118 | | |
| m+p-Xylene | 0.972 | | | 0.0500 | " | 1.000 | | 97% | 79.8-121 | | |
| Bromoform | 0.503 | | | 0.0250 | " | 0.5000 | | 101% | 72.4-119 | | |
| Styrene | 0.458 | | | 0.0250 | " | 0.5000 | | 92% | 71.5-122 | | |
| 1,1,2,2-Tetrachloroethane | 0.506 | | | 0.0250 | " | 0.5000 | | 101% | 92-106 | | |
| o-Xylene | 0.486 | | | 0.0250 | " | 0.5000 | | 97% | 77.6-124 | | |
| 4-ethyltoluene | 0.477 | K | | 0.0250 | " | 0.5000 | | 95% | 96.7-122 | | |
| 1,3,5-Trimethylbenzene | 0.474 | | | 0.0250 | " | 0.5000 | | 95% | 74.4-121 | | |
| 1,2,4-Trimethylbenzene | 0.477 | | | 0.0250 | " | 0.5000 | | 95% | 71.9-126 | | |
| 1,3-Dichlorobenzene | 0.486 | | | 0.0250 | " | 0.5000 | | 97% | 67.9-132 | | |
| Benzyl chloride | 0.496 | | | 0.0250 | " | 0.5000 | | 99% | 60.7-134 | | |
| 1,4-Dichlorobenzene | 0.483 | | | 0.0250 | " | 0.5000 | | 97% | 65.4-136 | | |
| 1,2-Dichlorobenzene | 0.501 | | | 0.0250 | " | 0.5000 | | 100% | 69.3-129 | | |
| Hexachlorobutadiene | Rejected | | | 0.0250 | " | 0.5000 | | 111% | 8.45-161 | | |
| 1,2,4-Trichlorobenzene | 0.576 | | | 0.0250 | " | 0.5000 | | 115% | 39.7-186 | | |
| Naphthalene | 0.640 | J | | 0.0500 | " | | | | 40-200 | | |
| Surrogate: Dichlorodifluoromethane | 0.491 | | | | " | 0.5000 | | 98% | 77.8-116 | | |
| Surrogate: Dichlorotetrafluoroethane | 0.474 | | | | " | 0.5000 | | 95% | 89-108 | | |
| Surrogate: Trichlorofluoromethane | 0.505 | | | | " | 0.5000 | | 101% | 78.6-114 | | |
| Surrogate: | 0.475 | | | | " | 0.5000 | | 95% | 75.3-119 | | |
| 1,1,2-trichloro-1,2,2-trifluoroethane (Freon) | | | | | | | | | | | |
| Surrogate: 1,1,1-Trichloroethane | 0.522 | | | | " | 0.5000 | | 104% | 92.5-105 | | |
| Surrogate: Carbon tetrachloride | 0.531 | | | | " | 0.5000 | | 106% | 76.3-118 | | |



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410055 - ColdTrap Dehydration

LCS Dup (B410055-BSD1)

Prepared & Analyzed: Oct-09-14

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Spike Level | Source Result | %REC Limits | RPD | RPD Limit |
|--------------------------|----------|-----------------------|-----|--------------------|-------|----------------|------------------|----------------|-----|--------------|
| Propene | 0.498 | Research | | 0.0500 | ppbv | 0.5000 | | 100% 76-112 | 1 | 19.6 |
| Chloromethane | 0.499 | | | 0.0250 | " | 0.5000 | | 100% 77.6-116 | 4 | 26.9 |
| Vinyl chloride | 0.503 | | | 0.0250 | " | 0.5000 | | 101% 77.4-117 | 0.1 | 25.1 |
| 1,3-butadiene | 0.469 | | | 0.0250 | " | 0.5000 | | 94% 77.7-115 | 3 | 33.2 |
| Bromomethane | 0.532 | | | 0.0250 | " | 0.5000 | | 106% 75.2-117 | 4 | 26.6 |
| Chloroethane | 0.515 | | | 0.0250 | " | 0.5000 | | 103% 79.8-114 | 3 | 29.5 |
| Ethanol | 0.664 | | | 0.0250 | " | 0.5000 | | 133% 50-124 | 3 | 200 |
| Acrolein | 0.625 | | | 0.0500 | " | 0.5000 | | 125% 67.9-130 | 4 | 29.8 |
| Isopropyl alcohol | 0.436 | J | | 0.250 | " | 0.5000 | | 87% 81-106 | 10 | 25 |
| Acetone | 0.645 | | | 0.0500 | " | 0.5000 | | 129% 60-137 | 0.4 | 28.7 |
| 1,1-Dichloroethene | 0.538 | | | 0.0250 | " | 0.5000 | | 108% 77.3-118 | 4 | 15.9 |
| Methylene chloride | 0.537 | | | 0.0250 | " | 0.5000 | | 107% 78.7-117 | 4 | 20.7 |
| Carbon disulfide | Rejected | | | 0.0250 | " | 0.5000 | | 126% 53-140 | 43 | 200 |
| Cyclopentane | U | | | 0.0250 | " | | | 74-117 | | 31.2 |
| Methyl tert-butyl ether | 0.508 | | | 0.0250 | " | 0.5000 | | 102% 79.1-118 | 1 | 31.9 |
| 1,1-Dichloroethane | 0.522 | | | 0.0250 | " | 0.5000 | | 104% 79.8-117 | 3 | 13.1 |
| Vinyl acetate | 0.503 | | | 0.0250 | " | 0.5000 | | 101% 85-106 | 2 | 200 |
| Hexane | 0.500 | | | 0.0250 | " | 0.5000 | | 100% 70.1-121 | 0.8 | 43.5 |
| 2-Butanone | 0.544 | | | 0.0500 | " | 0.5000 | | 109% 82-108 | 5 | 25 |
| cis-1,2-Dichloroethene | 0.524 | | | 0.0250 | " | 0.5000 | | 105% 78.1-115 | 1 | 29.6 |
| trans-1,2-Dichloroethene | 0.531 | | | 0.0250 | " | 0.5000 | | 106% 0-200 | 3 | 25 |
| Chloroform | 0.547 | | | 0.0250 | " | 0.5000 | | 109% 79.6-115 | 5 | 25.2 |
| Ethyl acetate | 0.533 | | | 0.0250 | " | 0.5000 | | 107% 0-200 | 4 | 25 |
| 1,2-Dichloroethane | 0.557 | | | 0.0250 | " | 0.5000 | | 111% 79.8-115 | 9 | 24.6 |
| Cyclohexane | 0.478 | | | 0.0500 | " | 0.5000 | | 96% 72.5-119 | 2 | 34.5 |
| Tetrahydrofuran | 0.527 | | | 0.0250 | " | 0.5000 | | 105% 0-200 | 1 | 25 |
| Benzene | 0.537 | | | 0.0250 | " | 0.5000 | | 107% 75.7-118 | 2 | 27.4 |
| n-Heptane | 0.512 | | | 0.0250 | " | 0.5000 | | 102% 66.9-152 | 4 | 25 |
| 1,2-Dichloropropane | 0.569 | | | 0.0250 | " | 0.5000 | | 114% 76.8-118 | 10 | 25.3 |
| Trichloroethene | 0.530 | | | 0.0250 | " | 0.5000 | | 106% 70.1-119 | 6 | 34.1 |
| Bromodichloromethane | 0.583 | | | 0.0250 | " | 0.5000 | | 117% 75.8-117 | 8 | 26.5 |
| Methyl methacrylate | 0.544 | | | 0.0250 | " | 0.5000 | | 109% 0-200 | 5 | 200 |
| 1,4-Dioxane | 0.546 | | | 0.0250 | " | 0.5000 | | 109% 54.7-150 | 7 | 58.6 |
| cis-1,3-Dichloropropene | 0.573 | | | 0.0250 | " | 0.5000 | | 115% 75.5-115 | 3 | 31.1 |



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Chicago Regional Laboratory

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Air Division, US EPA Region 5
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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410055 - ColdTrap Dehydration

LCS Dup (B410055-BSD1)

Prepared & Analyzed: Oct-09-14

| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|----------|-----------------------|-----|--------------------|-------|----------------|------------------|------|----------------|-----|--------------|
| 4-Methyl-2-pentanone | 0.500 | | | 0.0250 | ppbv | 0.5000 | | 100% | 62.9-133 | 3 | 42 |
| trans-1,3-Dichloropropene | 0.547 | | | 0.0250 | " | 0.5000 | | 109% | 75.8-117 | 3 | 31.7 |
| 1,1,2-Trichloroethane | 0.549 | | | 0.0250 | " | 0.5000 | | 110% | 92.3-106 | 8 | 11.5 |
| Dibromochloromethane | 0.591 | | | 0.0250 | " | 0.5000 | | 118% | 69-132 | 7 | 25 |
| Toluene | 0.555 | | | 0.0250 | " | 0.5000 | | 111% | 73.2-120 | 3 | 30.6 |
| 2-Hexanone | 0.524 | | | 0.0250 | " | 0.5000 | | 105% | 76-110 | 2 | 46.8 |
| 1,2-Dibromoethane (EDB) | 0.568 | | | 0.0250 | " | 0.5000 | | 114% | 75.5-118 | 5 | 31.5 |
| Tetrachloroethene | 0.557 | | | 0.0250 | " | 0.5000 | | 111% | 67.1-125 | 9 | 13.8 |
| Chlorobenzene | 0.535 | | | 0.0250 | " | 0.5000 | | 107% | 68.5-121 | 4 | 31.9 |
| Ethylbenzene | 0.509 | | | 0.0250 | " | 0.5000 | | 102% | 74.9-118 | 4 | 31.6 |
| m+p-Xylene | 1.01 | | | 0.0500 | " | 1.000 | | 101% | 79.8-121 | 4 | 28.9 |
| Bromoform | 0.525 | | | 0.0250 | " | 0.5000 | | 105% | 72.4-119 | 4 | 34.6 |
| Styrene | 0.499 | | | 0.0250 | " | 0.5000 | | 100% | 71.5-122 | 9 | 19.7 |
| 1,1,2,2-Tetrachloroethane | 0.540 | | | 0.0250 | " | 0.5000 | | 108% | 92-106 | 7 | 11.5 |
| o-Xylene | 0.501 | | | 0.0250 | " | 0.5000 | | 100% | 77.6-124 | 3 | 28.7 |
| 4-ethyltoluene | 0.498 | K | | 0.0250 | " | 0.5000 | | 100% | 96.7-122 | 4 | 25 |
| 1,3,5-Trimethylbenzene | 0.495 | | | 0.0250 | " | 0.5000 | | 99% | 74.4-121 | 4 | 29.8 |
| 1,2,4-Trimethylbenzene | 0.501 | | | 0.0250 | " | 0.5000 | | 100% | 71.9-126 | 5 | 32.1 |
| 1,3-Dichlorobenzene | 0.506 | | | 0.0250 | " | 0.5000 | | 101% | 67.9-132 | 4 | 37.9 |
| Benzyl chloride | 0.497 | | | 0.0250 | " | 0.5000 | | 99% | 60.7-134 | 0.2 | 48.3 |
| 1,4-Dichlorobenzene | 0.511 | | | 0.0250 | " | 0.5000 | | 102% | 65.4-136 | 6 | 39.6 |
| 1,2-Dichlorobenzene | 0.522 | | | 0.0250 | " | 0.5000 | | 104% | 69.3-129 | 4 | 34 |
| Hexachlorobutadiene | Rejected | | | 0.0250 | " | 0.5000 | | 113% | 8.45-161 | 2 | 25 |
| 1,2,4-Trichlorobenzene | 0.498 | | | 0.0250 | " | 0.5000 | | 100% | 39.7-186 | 15 | 77.1 |
| Naphthalene | 0.514 | J | | 0.0500 | " | | | | 40-200 | 22 | 200 |
| Surrogate: Dichlorodifluoromethane | 0.510 | | | | " | 0.5000 | | 102% | 77.8-116 | | |
| Surrogate: Dichlorotetrafluoroethane | 0.501 | | | | " | 0.5000 | | 100% | 89-108 | | |
| Surrogate: Trichlorofluoromethane | 0.533 | | | | " | 0.5000 | | 107% | 78.6-114 | | |
| Surrogate: | 0.527 | | | | " | 0.5000 | | 105% | 75.3-119 | | |
| 1,1,2-trichloro-1,2,2-trifluoroethane (Freon) | | | | | | | | | | | |
| Surrogate: 1,1,1-Trichloroethane | 0.549 | | | | " | 0.5000 | | 110% | 92.5-105 | | |
| Surrogate: Carbon tetrachloride | 0.547 | | | | " | 0.5000 | | 109% | 76.3-118 | | |



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410055 - ColdTrap Dehydration

| Duplicate (B410055-DUP1) | | Source: 1410012-05 | | Prepared & Analyzed: Oct-09-14 | | | | | | | |
|--------------------------|----------|-----------------------|-----|--------------------------------|-------|----------------|------------------|------|----------------|-----|--------------|
| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
| Propene | 0.873 | K, Research | | 0.100 | ppbv | | 0.877 | | | 0.5 | 30 |
| Chloromethane | 0.507 | | | 0.0500 | " | | 0.536 | | | 6 | 30 |
| Vinyl chloride | U | | | 0.0500 | " | | U | | | | 30 |
| 1,3-butadiene | 0.0345 | K | | 0.0500 | " | | U | | | | 30 |
| Bromomethane | U | | | 0.0500 | " | | 6.86E-3 | | | | 30 |
| Chloroethane | U | | | 0.0500 | " | | 7.11E-3 | | | | 30 |
| Ethanol | 1.82 | K | | 0.0500 | " | | 1.97 | | | 8 | 40 |
| Acrolein | 0.413 | | | 0.100 | " | | 0.420 | | | 2 | 40 |
| Isopropyl alcohol | 1.71 | | J | 0.500 | " | | 2.02 | | | 17 | 40 |
| Acetone | 2.16 | BC, J | | 0.100 | " | | 2.25 | | | 4 | 40 |
| 1,1-Dichloroethene | U | | | 0.0500 | " | | U | | | | 30 |
| Methylene chloride | 0.103 | | | 0.0500 | " | | 0.111 | | | 7 | 30 |
| Carbon disulfide | Rejected | | | 0.0500 | " | | Rejected | | | 42 | 40 |
| Cyclopentane | U | | | 0.0500 | " | | U | | | | 30 |
| Methyl tert-butyl ether | U | | | 0.0500 | " | | U | | | | 40 |
| 1,1-Dichloroethane | U | | | 0.0500 | " | | U | | | | 30 |
| Vinyl acetate | U | | | 0.0500 | " | | U | | | | 40 |
| Hexane | 0.167 | B | | 0.0500 | " | | 0.178 | | | 7 | 30 |
| 2-Butanone | 0.258 | | BC | 0.100 | " | | 0.257 | | | 0.3 | 50 |
| cis-1,2-Dichloroethene | U | | | 0.0500 | " | | U | | | | 30 |
| trans-1,2-Dichloroethene | U | | | 0.0500 | " | | U | | | | 30 |
| Chloroform | 0.0203 | | | 0.0500 | " | | 0.0294 | | | 37 | 30 |
| Ethyl acetate | 0.0664 | | | 0.0500 | " | | 0.0731 | | | 10 | 40 |
| 1,2-Dichloroethane | U | | | 0.0500 | " | | 0.0135 | | | | 30 |
| Cyclohexane | U | | | 0.100 | " | | U | | | | 30 |
| Tetrahydrofuran | U | | | 0.0500 | " | | U | | | | 40 |
| Benzene | 0.149 | | | 0.0500 | " | | 0.156 | | | 5 | 30 |
| n-Heptane | 0.104 | | | 0.0500 | " | | 0.114 | | | 9 | 30 |
| 3-Pentanone | U | | | 0.0500 | " | | U | | | | 40 |
| 1,2-Dichloropropane | U | | | 0.0500 | " | | 5.33E-3 | | | | 30 |
| Trichloroethene | U | | | 0.0500 | " | | U | | | | 30 |
| Bromodichloromethane | U | | | 0.0500 | " | | U | | | | 30 |
| Methyl methacrylate | U | | | 0.0500 | " | | U | | | | 40 |
| 1,4-Dioxane | U | | | 0.0500 | " | | 5.81E-3 | | | | 40 |



Environmental Protection Agency Region 5
Chicago Regional Laboratory

536 South Clark Street, Chicago, IL 60605
Phone:(312)353-8370 Fax:(312)886-2591

Air Division, US EPA Region 5
77 West Jackson Boulevard
Chicago IL, 60605

Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-27-15 11:15

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410055 - ColdTrap Dehydration

| Duplicate (B410055-DUP1) | | Source: 1410012-05 | | Prepared & Analyzed: Oct-09-14 | | | | | | | |
|--|----------|-----------------------|-----|--------------------------------|-------|----------------|------------------|------|----------------|--------|--------------|
| Analyte | Result | Flags / Qualifiers | MDL | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
| cis-1,3-Dichloropropene | U | | | 0.0500 | ppbv | | U | | | | 30 |
| 4-Methyl-2-pentanone | 0.0524 | B | | 0.0500 | " | | 0.0488 | | | 7 | 40 |
| trans-1,3-Dichloropropene | U | | | 0.0500 | " | | U | | | | 30 |
| 1,1,2-Trichloroethane | U | | | 0.0500 | " | | U | | | | 30 |
| Dibromochloromethane | U | | | 0.0500 | " | | U | | | | 30 |
| Toluene | 0.387 | | | 0.0500 | " | | 0.405 | | | 5 | 30 |
| 2-Hexanone | U | | | 0.0500 | " | | U | | | | 40 |
| 1,2-Dibromoethane (EDB) | U | | | 0.0500 | " | | U | | | | 30 |
| Tetrachloroethene | 0.0104 | | | 0.0500 | " | | 0.0119 | | | 14 | 30 |
| Chlorobenzene | U | | | 0.0500 | " | | U | | | | 30 |
| Ethylbenzene | 0.0791 | B | | 0.0500 | " | | 0.0765 | | | 3 | 30 |
| m+p-Xylene | 0.239 | | | 0.100 | " | | 0.242 | | | 1 | 30 |
| Bromoform | U | | | 0.0500 | " | | U | | | | 30 |
| Styrene | 0.0195 | | | 0.0500 | " | | 0.0228 | | | 15 | 30 |
| 1,1,2,2-Tetrachloroethane | U | | | 0.0500 | " | | U | | | | 30 |
| o-Xylene | 0.0845 | | | 0.0500 | " | | 0.0890 | | | 5 | 30 |
| 4-ethyltoluene | 0.0883 | K | | 0.0500 | " | | 0.0903 | | | 2 | 30 |
| 1,3,5-Trimethylbenzene | 0.0273 | | | 0.0500 | " | | 0.0271 | | | 0.5 | 30 |
| 1,2,4-Trimethylbenzene | 0.0840 | | | 0.0500 | " | | 0.0866 | | | 3 | 30 |
| 1,3-Dichlorobenzene | U | | | 0.0500 | " | | U | | | | 30 |
| Benzyl chloride | U | | | 0.0500 | " | | U | | | | 30 |
| 1,4-Dichlorobenzene | U | | | 0.0500 | " | | U | | | | 30 |
| 1,2-Dichlorobenzene | U | | | 0.0500 | " | | U | | | | 30 |
| Hexachlorobutadiene | Rejected | | | 0.0500 | " | | Rejected | | | | 30 |
| 1,2,4-Trichlorobenzene | U | | | 0.0500 | " | | U | | | | 30 |
| Naphthalene | 0.569 | J | | 0.100 | " | | 0.443 | | | 25 | 30 |
| Surrogate: Dichlorodifluoromethane | 0.464 | | | | " | 0.5250 | | 88% | | 90-120 | |
| Surrogate: Dichlorotetrafluoroethane | 0.0219 | J | | | " | 2.000E-2 | | 109% | | 80-120 | |
| Surrogate: Trichlorofluoromethane | 0.224 | | | | " | 0.2390 | | 94% | | 90-120 | |
| Surrogate: | 0.0816 | | | | " | 7.300E-2 | | 112% | | 90-120 | |
| 1,1,2-trichloro-1,2,2-trifluoroethane (Freon | | | | | | | | | | | |
| Surrogate: 1,1,1-Trichloroethane | 3.12E-3 | J | | | " | 5.000E-3 | | 62% | | 80-120 | |
| Surrogate: Carbon tetrachloride | 0.0816 | | | | " | 8.600E-2 | | 95% | | 80-120 | |



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Notes and Definitions

| | |
|----------|---|
| Research | Samples analyzed while the method is under development and contain results of unknown quality. No SOP in place at time of data release. Client was notified and accepted the terms as stated. |
| R | Rejected |
| K | The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value. |
| J | The identification of the analyte is acceptable; the reported value is an estimate. |
| BC | Analyte is detected in the sample within 5x the amount detected in the canister certification blank and may have a high bias from residual contamination in the canister used to sample. |
| B | Analyte concentration is < 5x that in the associated method blank(s); this concentration may be a high-bias estimate. |
| U | Not Detected |
| NR | Not Reported |